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Name.....................**41**.....

Reg. No..................................

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2014

(UG—CCSS)

Complementary Course—Chemistry

CH 4C 07—PHYSICAL CHEMISTRY—II

Time : Three Hours

Maximum : 30 Weightage

I. Answer *all* the questions. Each question carries a weightage ¼. This part contains multiple choice, fill in the blank and one-word answer questions :

1. In ————— process, the volume of the system remains constant.

2. The variation of melting point of a reaction with pressure is given by :

    (a) Arrhenius education.
    (b) Kirchhoff's equation.

    (c) Hess's law.
    (d) Claussius–Clapeyron equation.

3. Which of the following represents the relation between free energy change ΔG and enthalpy change ΔS ?

    (a) $\Delta G = \Delta H + T\Delta S$.
    (b) $\Delta G = \Delta H - T\Delta S$.

    (c) $\Delta G - \Delta H = T\Delta S$.
    (d) $-\Delta H = \Delta G - T\Delta S$.

4. Electrolytic conductance is due to the movement of :

    (a) Electrons.
    (b) Atoms.

    (c) ions.
    (d) Electrons and ions.

5. The cell potential becomes equal to E° when :

    (a) Equilibrium constant is 1.
    (b) Equilibrium constant is 10.

    (c) Equilibrium constant is 100.
    (d) Equilibrium constant is zero.

6. Due to surface tension, liquids try to have the ————— surface.

7. The osmotic pressure of NaCl solution is ————— than that of a solution of glucose of same concentration at the same temperature.

8. Smoke is a dispersion of :

    (a) Gas in gas.
    (b) Gas in solid.

    (c) Solid in gas.
    (d) Liquid in gas.

Turn over

9 When a strong beam of light is passed through a colloidal solution, the ligh be ——————.

10 Triple point is the temperature where :

  (a) Three components are in equilibrium.

  (b) Three phases are in equilibrium

  (c) Two phases are in equilibrium.

  (d) None of the above.

11 Which of the following is not a state function ?

  (a) Temperature.   (b) Entropy.

  (c) Enthalpy.   (d) Work.

12 For Zn-Cu cell, $E° = 1.10V$, if the reduction potential of Cu^{2+} (cd·)|Cu (s) couple is (that of Zn^{2+} (cd·)|(Zn (s) couple is :

  (a) – 0.76 V.   (b) 0.76 V.

  (c) 7.6 V.   (d) 0.38 V.

(12 × ¼ = 3 weig

II. Answer *all* the questions. Each question carries a weightage 1.

13 What is a galvanic cell ?

14 Explain the term overvoltage.

15 Explain the phenomenon of electrophoresis.

16 What do you understand by the term free energy ?

17 In winter season the path of sunlight is clearly visible at sunrise. Why ?

18 Give any *one* statement of the second law of thermodynamics.

19 Explain what is meant by specific rotation.

20 Explain the various terms involved in the phase rule equation.

21 Define Osmosis and Osmotic pressure.

(9 × 1 = 9 weig

III. Answer any *five* questions. Each question carries a weightage 2.

22 Discuss the application of phase rule to the water system.

23 Describe the applications of Hess's law.

24 What is Hardy-Schulze rule ? What are the principles involved in the mechanism of coagulation ?

25 Discuss Ostwald's dilution law and tis applications. Mention its limitations.

26 "Surface tension of water decreases on addition of soap or detergent". Explain. How does it change with temperature ?

27 What is a Calomel electrode ? Give the reaction taking place at the Calomel electrode.

28 Define the term enthalpy of neutralization. Explain why the heat of neutralization is less than -57 KJ mol^{-1} when 0.1M solution of acetic acid neutralizes 0.1M NaOH solution.

(5 × 2 = 10 weightage)

IV. Write essays on any *two* of the following, weightage 4.

29 Derive Clausius Clapeyron equation. Discuss its applications.

30 What are fuel cells ? Describe the functioning of (i) Hydrogen-Oxygen fuel cell ; (ii) Hydrocarbon–Oxygen fuel cell.

31 What are protective colloids ? Explain how a lyophilic colloid can stabilize a lyophobic colloid. What is meant by the term 'Gold number" ?

(2 × 4 = 8 weightage)